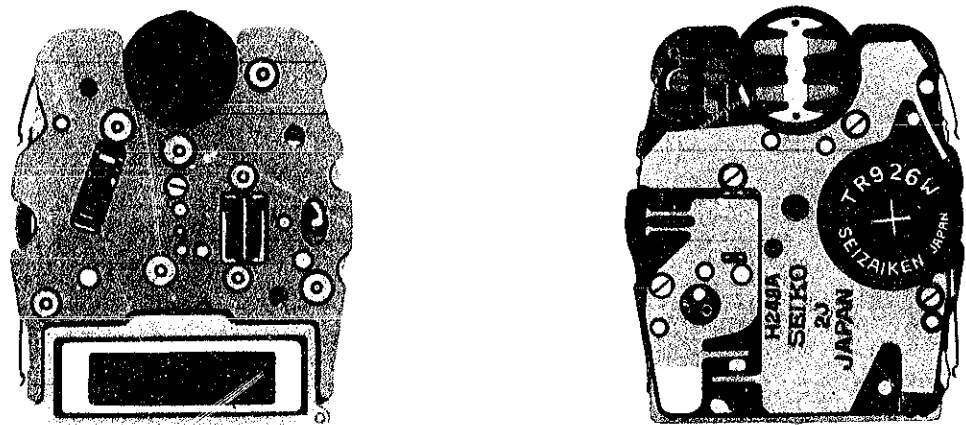


TECHNICAL GUIDE

SEIKO
QUARTZ

CAL.H249A
CAL.H259A

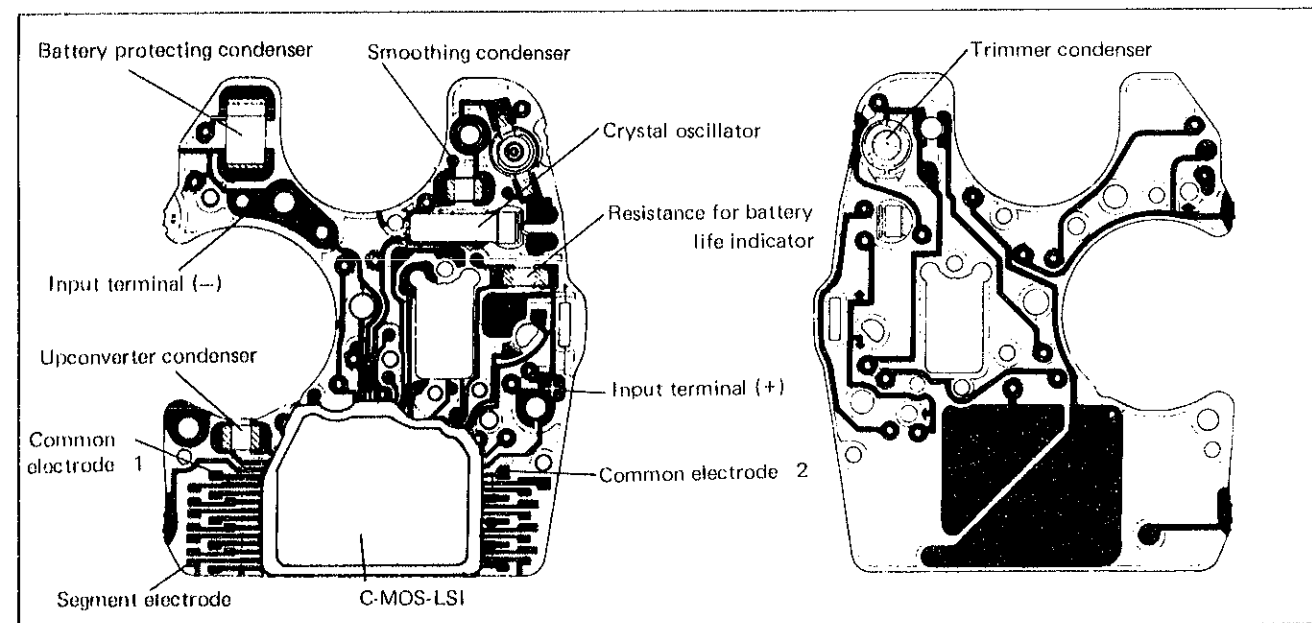


| | |
|---|----|
| I. SPECIFICATIONS | 1 |
| II. STRUCTURE OF THE CIRCUIT BLOCK | 1 |
| III. DISASSEMBLING, REASSEMBLING AND LUBRICATING | 2 |
| 1. Indicating mechanism | 2 |
| 2. Electronic circuit and liquid crystal panel | 3 |
| 3. Gear train and switch mechanism | 5 |
| 4. Segment (Liquid crystal panel electrode) | 6 |
| IV. CHECKING AND ADJUSTMENT | 7 |
| • Check battery voltage | 7 |
| • Check battery conductivity | 7 |
| • Check output signal | 7 |
| • Check conductivity of liquid crystal panel, circuit block, coil block and connectors | 7 |
| • Check liquid crystal panel | 7 |
| • Check coil block | 7 |
| • Check circuit block | 7 |
| • Check current consumption | 8 |
| • Check speaker block | 9 |
| • Check conductivity of switch components | 10 |
| • Check accuracy | 10 |
| • Check functioning and adjustment | 11 |

I. SPECIFICATIONS

| Item | | Cal. No. | H249A | H259A |
|---------------------------------|-------------------------------|----------|--|---|
| Analogue function | Time indication | | Two hand time indication (Hour and minute) | |
| | Additional mechanism | | Automatic electronic-handsetting by crown (Turning the crown clockwise or counterclockwise) | |
| Digital function | Display system | | Nematic Liquid Crystal, FEM (Field Effect Mode) | |
| | Liquid crystal driving system | | Multiplex driving system | |
| | Display system | | <ul style="list-style-type: none"> • Home time function • Calendar function • Alarm function • Stopwatch function • Local time function | |
| | Additional mechanism | | <ul style="list-style-type: none"> • Alarm test system • Time signal • Battery life indicator | |
| Loss/gain | | | Loss/gain at normal temperature range Monthly rate: less than 10 seconds (Annual rate: less than 2 minutes) | |
| Casing diameter | | | 26.1 mm (22.7 mm between 3 o'clock and 9 o'clock sides) | 23.1 mm (22.7 mm between 3 o'clock and 9 o'clock sides) |
| Height | | | 3.1 mm without battery | |
| Regulation system | | | Trimmer condenser | |
| Measuring gate by Quartz Tester | | | Any gate is available. (Measure at the analogue function) | |
| Battery | | | Battery life is approximately three years for SEIKO TR926W and two years for Maxell SR926W and U.C.C. 399. | |
| Jewels | | | 2 jewels | |

II. STRUCTURE OF THE CIRCUIT BLOCK



III. DISASSEMBLING, REASSEMBLING AND LUBRICATING

• Disassembling and reassembling

Disassembling procedures Figs: ① ~ ③⑦

Reassembling procedures Figs: ③⑦ ~ ①

• Lubricating

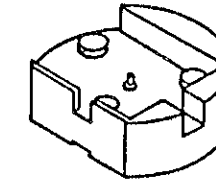
Types of oil

- Moebius A
- SEIKO Watch Oil S-6

Oil quantity

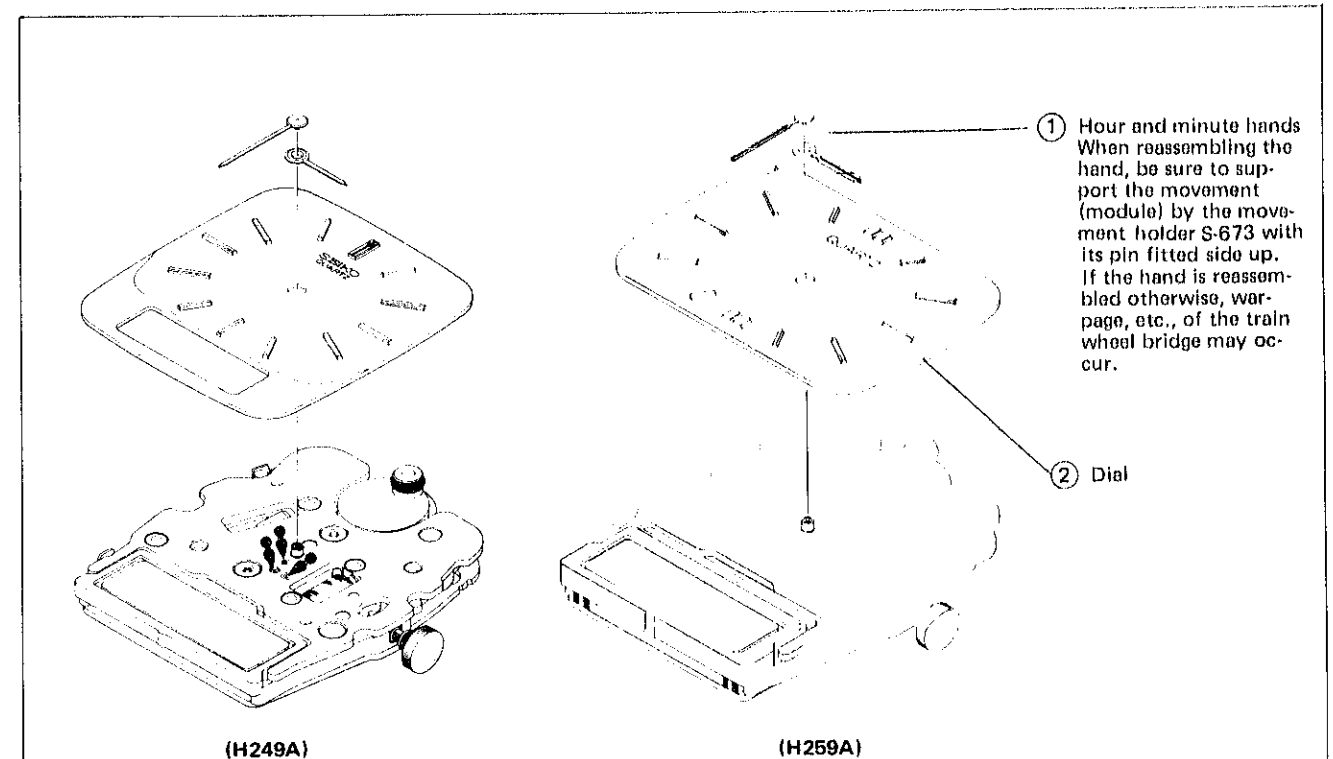
- Liberal
- Normal
- Extremely small

• Use the movement holder S-673.



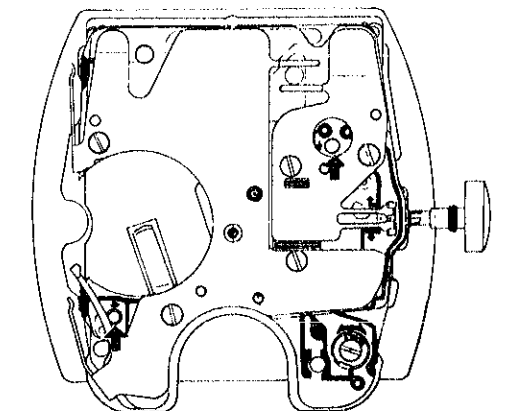
Movement holder S-673

1. Indicating mechanism



How to disassemble and reassemble the dial

- The dial is reassembled simply by pushing the dial leg into the main plate. The dial screw, etc., is not used.
- When disassembling the dial, push the pin (arrow-marked at 2 portions) alternately from the back of the movement (module) with a tapered screwdriver, etc. and disassemble it.
- When reassembling the dial, push it in so that it may stand level while taking care not to bend the dial leg.



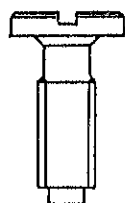
2. Electronic circuit and liquid crystal panel

• How to disassemble the speaker block

- Disassemble the speaker block from the caseband while lifting up its circumference by degrees with tweezers.
- Be careful not to lift up the speaker block terminal with tweezers. Otherwise deformation and broken wire may occur on it.

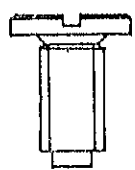
List of screws used

Circuit block screw A (2 pcs.)



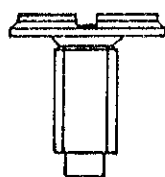
Parts No. 012 460

Circuit block screw B (3 pcs.)
Train wheel bridge screw (2 pcs.)

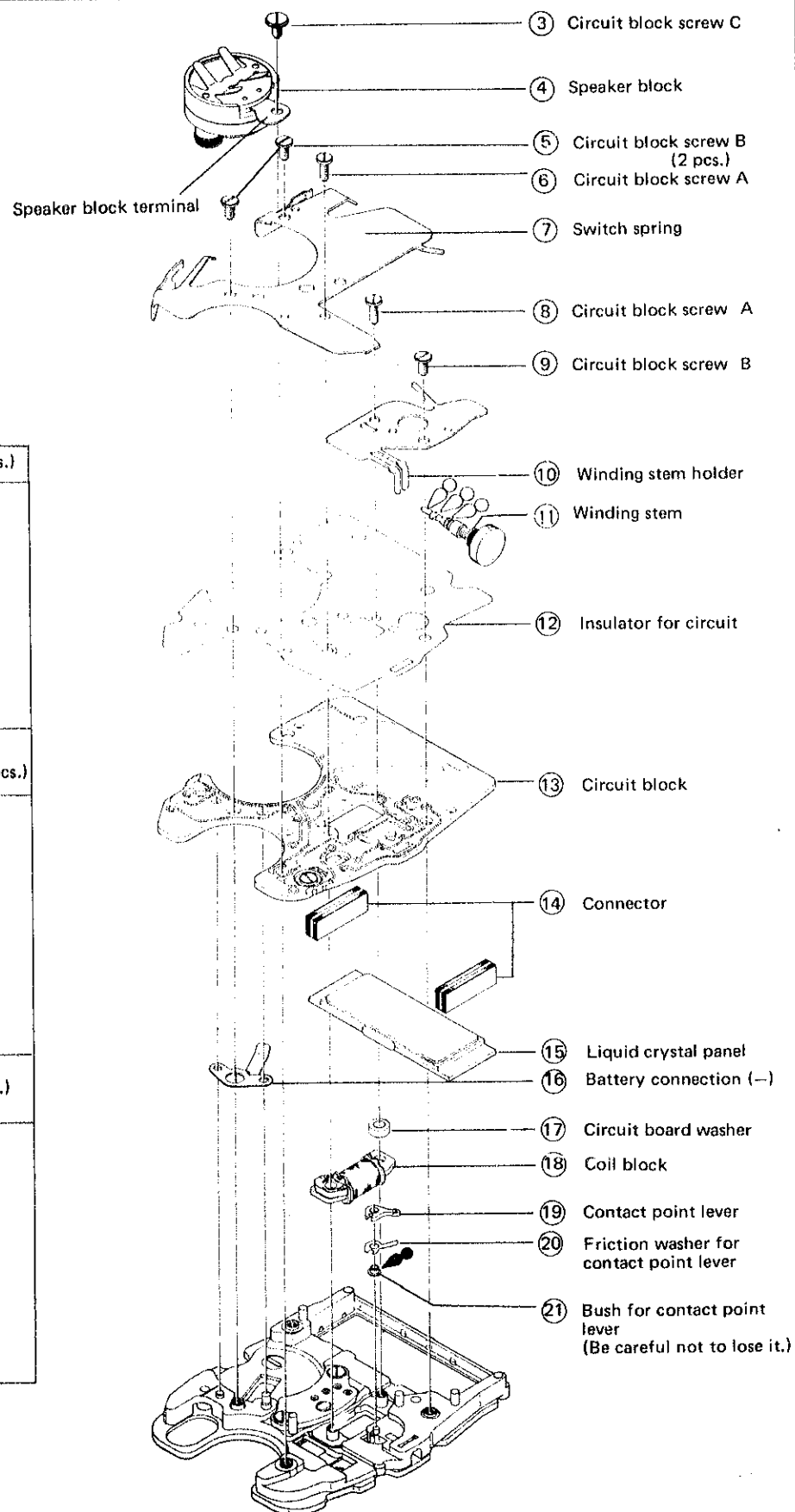


Parts No. 012 292

Circuit block screw C (1 pc.)



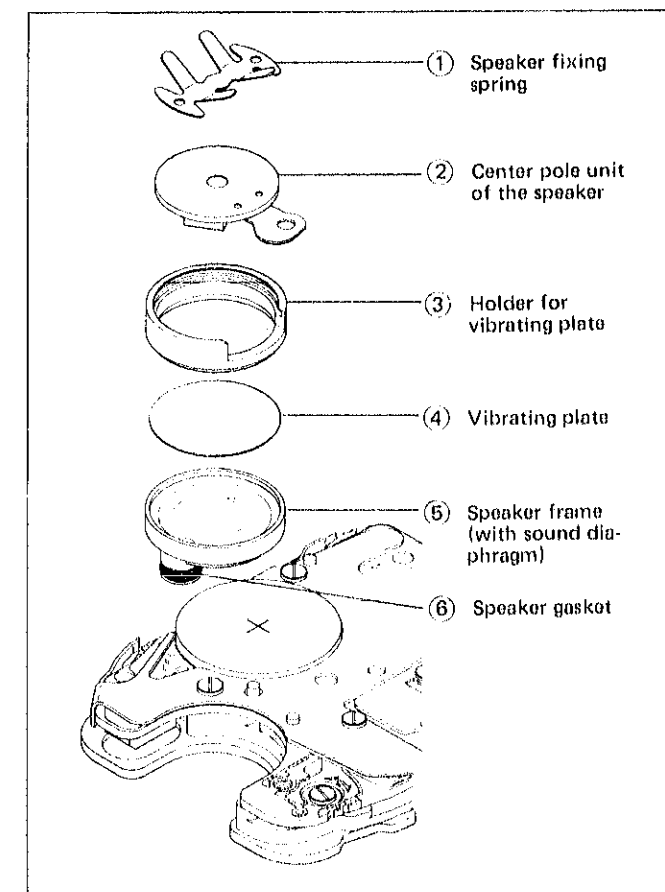
Parts No. 012 470



Remarks for disassembling and reassembling

④ Speaker block

- It is not necessary to disassemble the speaker block except when it is required to be replaced. But the components may occasionally be removed from the speaker frame as the speaker fixing spring is to be lifted up with tweezers when disassembling. In that case, be sure to reset the components so that dust may not enter the inside of the speaker block.
- If the vibrating plate and the sound diaphragm are deformed, the alarm will change in tone and volume. Be sure to handle them with care.



⑪ Winding stem

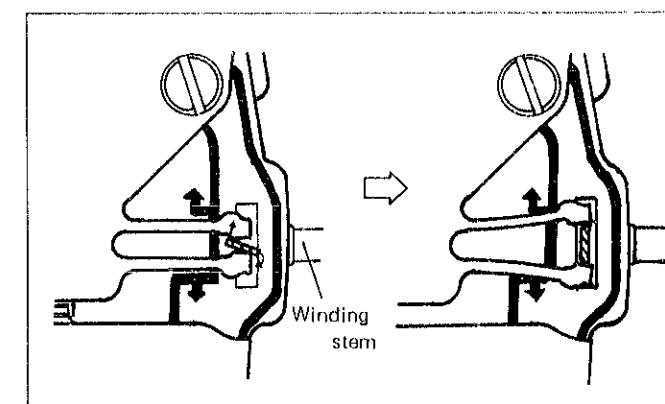
• Disassembling

Put a screwdriver at the tips of the winding stem holder and turn it to make the clearance between the winding stem and winding stem holder. Then pull out the winding stem while turning the crown.

- * Be careful not to open the winding stem holder too wide.

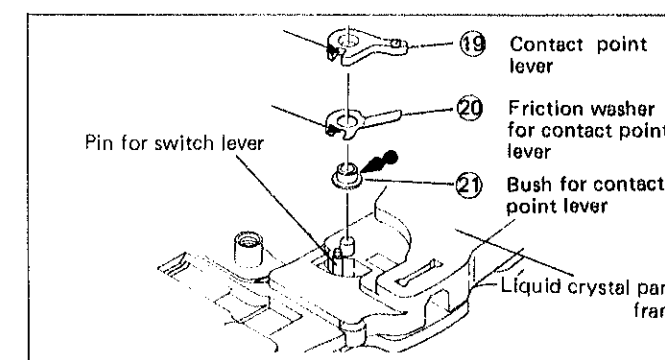
• Reassembling

Push it in gently while turning the crown slowly.

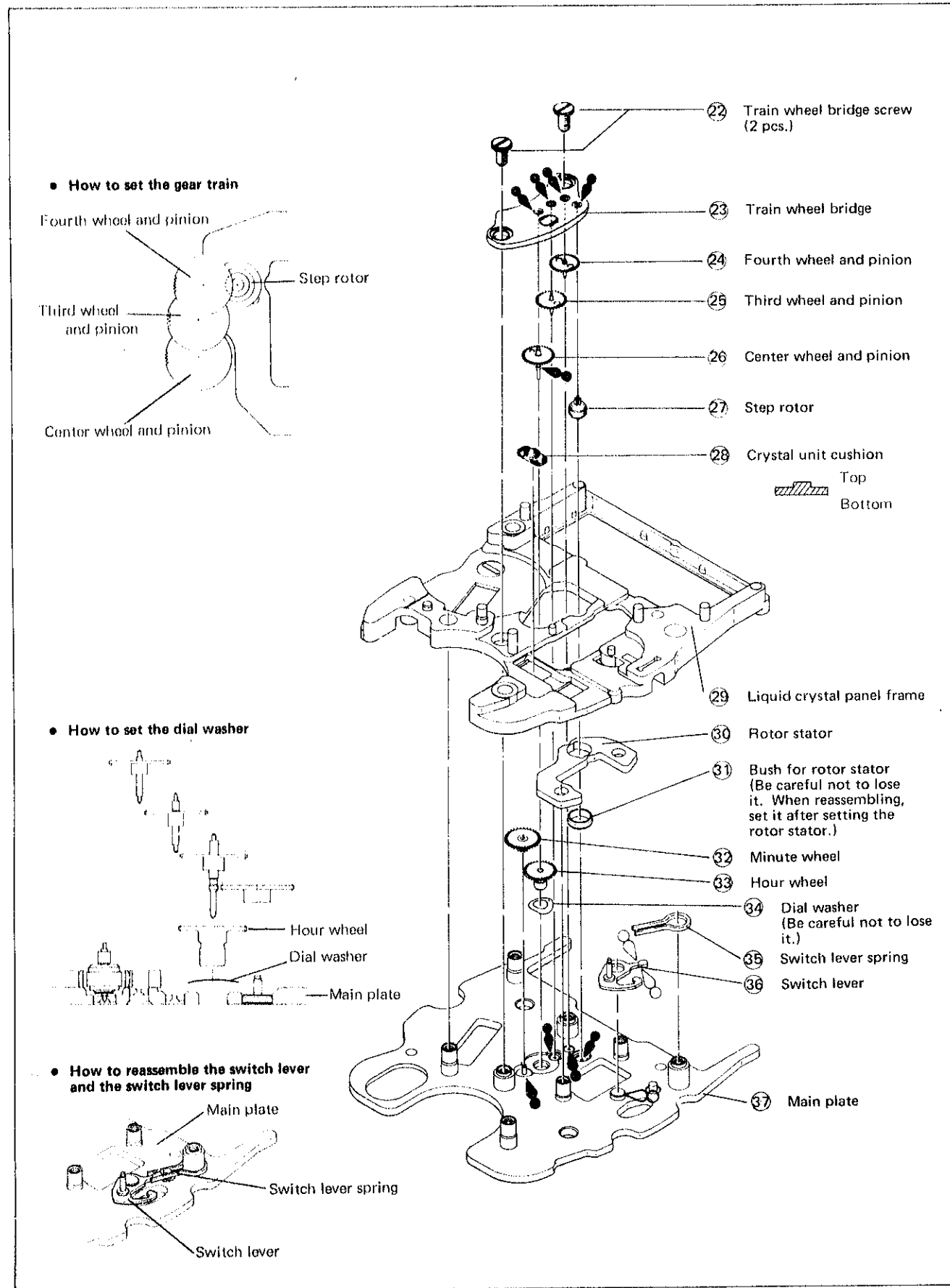


⑲ Contact point lever

Set the notches of the contact point lever and the friction washer for contact point lever (arrow-marked portion) to the pin of the switch lever provided in the liquid crystal panel frame.

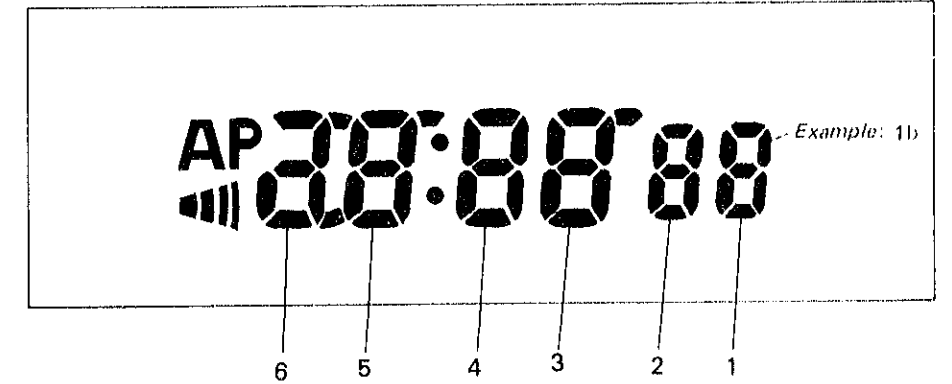
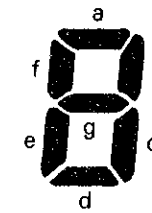


3. Gear train and switch mechanism



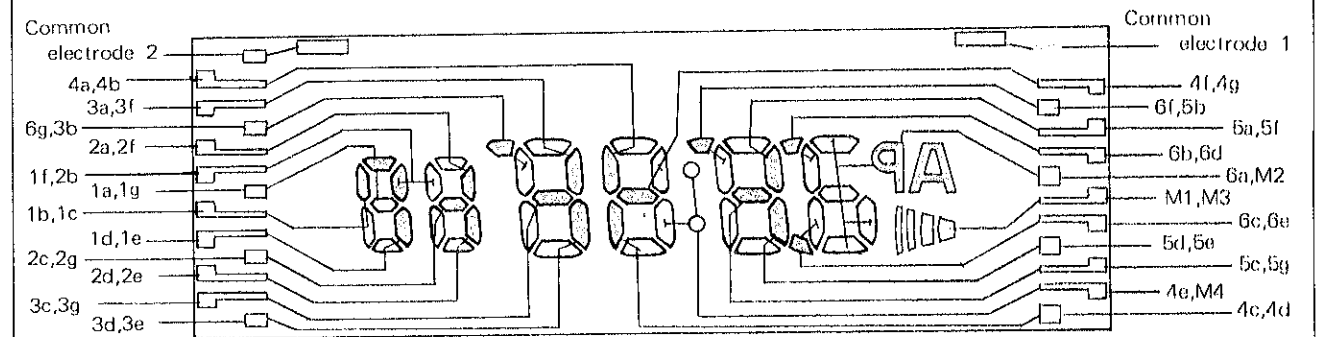
4. Segment (Liquid crystal panel electrode)

• Designation of segment



Common electrode 1 is connected electrically with segments.

Common electrode 2 is connected electrically with segments.

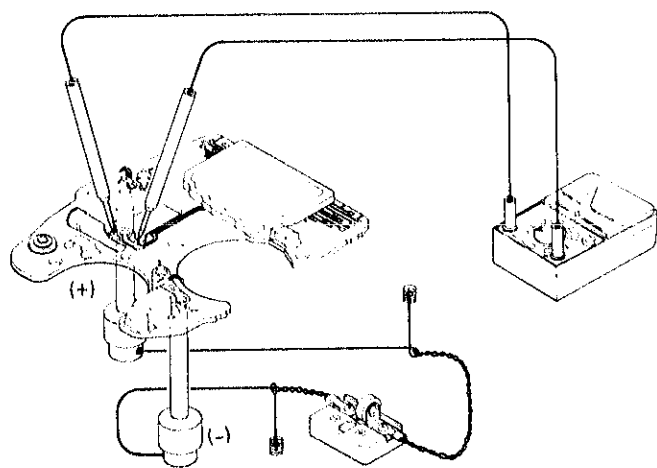


IV. CHECKING AND ADJUSTMENT

- Refer to the "SEIKO QUARTZ TECHNICAL GUIDE, GENERAL INSTRUCTION" for Digital Watches and Analogue Watches for details.

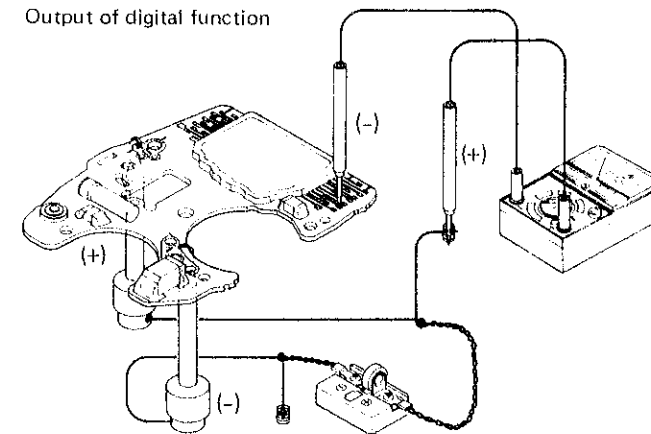
| Procedure | |
|---|--|
| CHECK BATTERY VOLTAGE | <p>Result: More than 1.5V: Normal Less than 1.5V: Defective</p> |
| CHECK BATTERY CONDUCTIVITY | |
| CHECK OUTPUT SIGNAL | <p>Result: Output signal is transmitted: Normal Output signal is not transmitted: Defective</p> |
| CHECK CONDUCTIVITY OF LIQUID CRYSTAL PANEL, CIRCUIT BLOCK, COIL BLOCK AND CONNECTORS | |
| CHECK LIQUID CRYSTAL PANEL | <p>Result: Lights up: Normal Does not light up: Defective</p> |
| CHECK COIL BLOCK | <p>Result: 2.2kΩ ~ 2.7kΩ: Normal Less than 2.2kΩ: (Short circuit) More than 2.7kΩ: (Broken wire) — Defective</p> |
| CHECK CIRCUIT BLOCK | <p>Result: Pointer of the Volt-ohm-meter swings every 10 seconds: Normal Pointer of the Volt-ohm-meter does not swing every 10 seconds: Defective * Replace the circuit block with a new one.</p> |

Output of analogue function

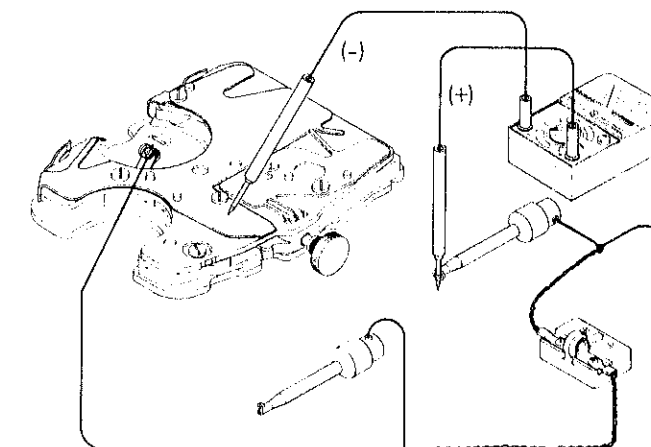


| Procedure | |
|-----------------------------------|--|
| Output of digital function | <p>Result: More than 0.8V: Normal Less than 0.8V: Defective * Replace the circuit block with a new one.</p> |
| CHECK CURRENT CONSUMPTION | <p>Result: Less than 2.7μA: Normal More than 2.7μA: Defective</p> |

Output of digital function



CHECK CURRENT CONSUMPTION



* Remarks for measuring the current consumption

- This watch steps at 10-second intervals for the analogue function and the pointer of the Volt-ohm-meter swings once every 10 seconds.
- When the probe (-) of the Volt-ohm-meter is applied as shown in the illustration above, the pointer of the Volt-ohm-meter swings slightly, indicating that the current is flowing through the IC (including the liquid crystal panel).

Since more current flows in addition to the current running through the IC (including the liquid crystal panel) to drive the step motor once every 10 seconds, the pointer of the Volt-ohm-meter swings then greatly.

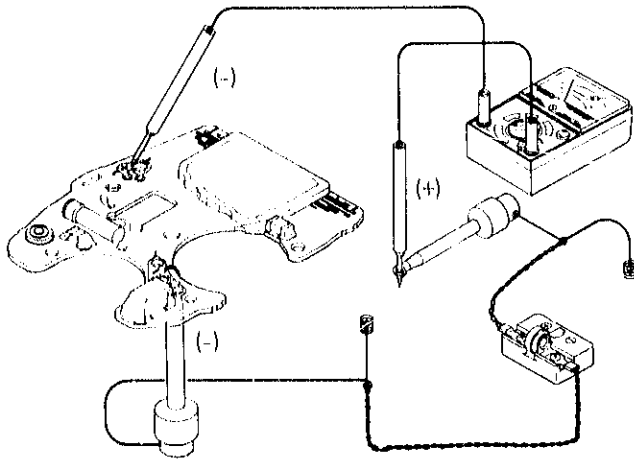
- Calculate the current consumption as follows:
(Ex.) IC current = 2.0μA, IC current + step motor driving current = 2.2μA, therefore the current only for driving the step motor is 0.2μA. It is, however, the value at 10-second stepping. Therefore, it is required to convert 0.2μA into the value at 1-second stepping in order to obtain the current consumption. Reduce the value (0.2μA) into 1/10, and the current consumption only for the step motor is 0.02μA. Accordingly the current consumption for this watch is calculated as: 2.0μA + 0.02μA = 2.02μA.

Procedure

* How to check if the liquid crystal panel or the circuit block is defective when the current consumption is more than $2.7\mu\text{A}$.

[1] Check the current consumption with the circuit block alone.

Result:
 Less than $2.2\mu\text{A}$: Normal
 Proceed to [2].
 More than $2.2\mu\text{A}$: Defective
 Replace the circuit block with a new one.

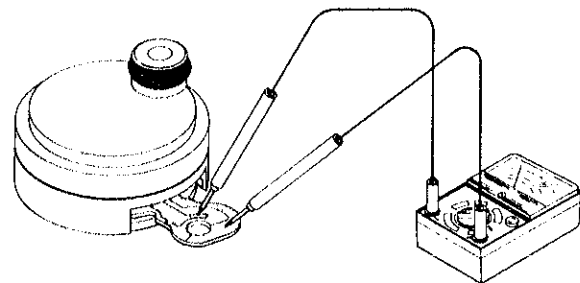


[2] Check the current consumption with the coil block alone.

Result:
 Less than $2.5\mu\text{A}$: Normal
 Check the gear train and the step rotor.
 More than $2.5\mu\text{A}$: Defective
 Replace the liquid crystal panel with a new one.

CHECK SPEAKER BLOCK

• Check with the speaker block turned over.



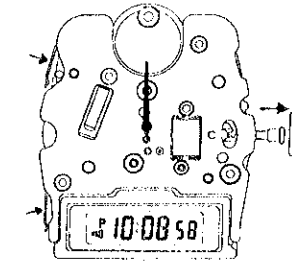
Result:
 $120\Omega \sim 140\Omega$: Normal
 Less than 120Ω
 (Short circuit) } Defective
 More than 140Ω
 (Broken wire) }
 Replace the speaker block.

Procedure

CHECK CONDUCTIVITY OF SWITCH COMPONENTS

• Check after reassembling the battery and the minute hand to the movement.

Result:
 Functions correctly: Normal
 Does not function correctly: Defective
 * If it is not adjustable, replace the switch spring with a new one.



Pull out the crown and turn it clockwise or counterclockwise.

Result:
 When turned, it clicks and the hand moves: Normal
 When turned, it does not click and the hand does not move: Defective

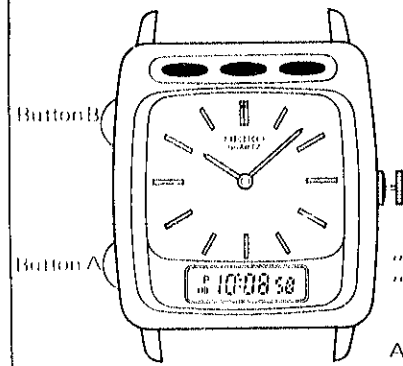
- Check circuit block
- Check circuit block conductivity
- Check reassembling of switch components
 (Refer to the setting of the contact point lever on page 4.)

CHECK ACCURACY

- Check accuracy according to the accuracy measuring method for the analogue quartz watches. (When accuracy is measured by the accuracy measuring method for the digital quartz watches, it cannot be checked stably.)
- In the analogue function, the minute hand moves at 10-second intervals and transmits the pulse for measuring the daily rate every two seconds.

Procedure

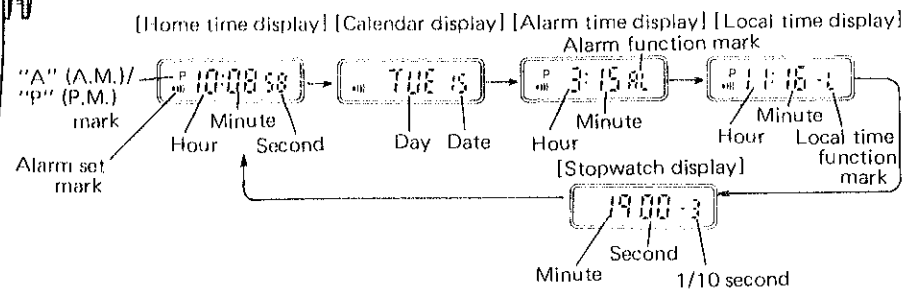
CHECK FUNCTIONING AND ADJUSTMENT



Check the digital function.

Result:

- Check to see if the display changes in the following order by each depression of the button A.



- Check to see if when the button B is depressed for 3 ~ 4 seconds in each display except in the stopwatch display a part of the display starts flashing with chime and if the flashing part changes by each depression of the button B.
- Check to see if the digit or the day advances one by one at the flashing display by each depression of the button A.

Check the analogue function.

Result:

- Check to see if one hour is adjusted when the crown is turned clockwise or counterclockwise 2 clicks with the crown at the first click position.
- Check to see if 30 seconds is adjusted when the crown is turned one click with the crown at the first click position.

All procedures of Disassembling, Reassembling, Checking and Adjustment are completed.